

memoirs certain valuable scientific manuscripts now in hand, the alternative of being obliged to send them to some other establishment having more means at its disposal being greatly deplored, as they were based upon the collections of the Academy, and should legitimately appear under its auspices.

THE Clifton College Scientific Society has just issued the second part of its Transactions, containing the record of its proceedings from February to July, 1871. The president and secretary state in their Report that the papers read at the Society's meetings have been as numerous as previously, and the attendance of members and visitors has in no degree fallen off; and that, although there is still much to be desired in this respect, yet the number of working members is steadily increasing. The various sections of botany, zoology, entomology, geology, archæology, chemistry, and physics have, on the whole, done good work, the least satisfactory reports being in the case of zoology, chemistry, and physics. The great event of the half-year has been the long-expected opening of the new Museum and Botanic Garden, both of which institutions are well deserving of support from those outside the school who are able to assist in furnishing them. The Botanic Garden is already one of the very best to be met with anywhere in the provinces. Among the papers read before the society and printed in the Transactions, the following have struck us as especially excellent:—"A Scientific Visit to Cheddar," by the President and J. Stone; "The Church of St. Mary Redcliffe, Bristol," by R. W. Wilson; "The Coalfield of South Wales," by A. Cruttwell; "The Birds of Clifton," by D. Pearce; and an admirable paper on "The Spectrum," by W. A. Smith.

THE last number of the *Bulletin de la Société de Géographie* contains an article by Delesse on the oscillations of the coasts of France.

THE Annual Address, delivered before the Albany Institute, New York, by Orlando Meads, on May 25, 1871, has just reached us. It is chiefly occupied with a sketch of the history of this successful and enterprising institution.

THE *Poona Observer* of February 6 gives the following account of Indian Geological Excursions:—"The Principal of the Poona Civil Engineering College, Mr. T. Cooke, together with the Professor of Chemistry, Mr. S. Cooke, with about twenty students of the first class, proceeded on a geological excursion on January 29, and arrived here on Saturday morning last. After leaving Poona they arrived at Shabad, where they remained for a whole day. The next morning they left Shabad and arrived at Krishtna at about ten in the morning, and inspected the Krishtna Bridge. After inspecting several works of the G. I. P. R., they started for Poona on the afternoon of Friday. The thanks of the students as well as of the Principals are due to the G. I. P. R. Company, in kindly placing their waiting-rooms at the several stations where they halted, at the disposal of the boys. The expense of this excursion is to be borne solely by Government. The amount allotted for the purpose of this excursion was 500 Rs."

THE following account of the Aurora of February 4 appears in the *Times of India* of the following day:—"A magnificent Aurora was visible, from the Rawul Pindee portion of the Punjab, last night, February 4, from 12 to past 12.30 o'clock. It occupied the northern quadrant of a clear sky, or rather more, the stars shining dimly through a glowing deep red hazy light reaching half way up the heavens, and which was crossed by thin vertical rays of white light stretching to the south. The night was calm but less frosty than usual at this season, and the oldest inhabitant who witnessed the display averred he had never seen anything like it in his life before." The suggestion made by our correspondent Mr. Earwaker, that we witnessed on that day a combination of the Northern and Southern Aurora, is thus confirmed.

## SCIENCE IN PLAIN ENGLISH

IN a paper under this heading, in the *Boston Journal of Chemistry*, Mr. C. A. Joy, after quoting from our articles of June 22 and 29, 1871, proceeds thus:—"We must admit that what Mr. Rushton says of English schools applies equally well to our own. Does anybody know of a preparatory school in the United States where instruction in science is given on a systematic plan by teachers especially fitted for the work, and with well-selected apparatus and judicious text-books, and where an equal value for excellence in science is given to pupils as for mathematics and the languages? There are, doubtless, some such schools, but it is my misfortune never to have heard of them. The truth is, there are few teachers. The custom in this world of studying everything else but the world we live in, which has been handed down to us from our ancestors, has precluded the possibility of anybody being fitted to teach the natural sciences excepting the few who have had the energy and the means to overcome every obstacle, and to learn something; and they are so rare that they are not to be had for ordinary schools. We are now in a fair way to acquire considerable knowledge of the planet Mars, its climate and physical condition; and it may be that we shall some day be favoured by a visit from an inhabitant of that distant world. The arrival of such a visitor would be rapidly heralded over the land, and he would be introduced to our best society, to the leading men of education; and as he would doubtless be possessed of an inquiring turn of mind, he would have many embarrassing questions to ask. He might address the inquiry to the gentleman on his right at the public dinner, which would be sure to be given to him, as to the composition of the crust of the earth; or he might ask what the glass windows were made of, and what form of light shone through them, or the water on the table and the air of the room might absorb his attention. If the respondent happened to be a University bred man the chances are ten to one he could not answer a single question; he would be forced to say that the study of the language of a people formerly occupying a small portion of the globe had monopolised all of his time, and prevented the acquisition of a knowledge of any of the natural phenomena around him; he might, in fact, have more knowledge of Mars than of the earth. It is probable that our visitor would be slightly astonished at the ignorance of the best educated members of the community. I do not know that we are bound to prepare ourselves for the approaching visit, but the very suggestion of it ought to startle us a little out of our propriety, and make us review the course of instruction we have pursued for so many years. As long as the requirements for admission to college are left just as they are at present, all persons who expect to go to college must follow a prescribed course or be found wanting. The teacher in a preparatory school knows that the pupil can attend only a certain number of hours, and to get up his task for admission to college nearly all this time must be devoted to classical studies. There is no time left for science, and it is not taught. This state of things has led to a violent controversy on the part of the advocates of the two systems, and the question appears to be no nearer a solution at the present time than it was many years ago. The advocates of classical training will not yield an inch of ground, and the scientists are equally firm. It is a pity that some compromise cannot be effected, as a knowledge of Latin and Greek is of great value to the scientific student, and ought not to be omitted. And as the classicists now have the colleges in their power, would it not be well for them to recommend a knowledge of language rather than of grammar, and a facility of reading generally instead of prescribing the precise number of chapters and verses? If the teacher of Chemistry, for example, were to insist upon the students studying 100 pages of Miller, 50 pages of Roscoe, two books of Gerhardt, the correspondence of Lavoisier, and the life of Berzelius, before presenting himself for examination, he would be looked upon as slightly deranged; and yet this is precisely what is done by our classical friends. A chemist can tell in half an hour whether the candidate is prepared to go on with a certain class; and he cares not how, when, or where the applicant obtained the knowledge. Not so our classical friends; they insist upon chapter and verse as if there were a charm in the prescribed number—and by so doing they do great harm to our schools. A friend of mine desired to put his son at a select school, and had a long conversation with the principal in reference to the studies he would have to pursue in order to fit him for college. The principal had the experience of thirty years in his calling, and

knew precisely what was required. He produced his scheme of hours, and convinced the parent that in order to fit his son for college it would be necessary for him to devote a certain number of hours to the reading of a prescribed number of pages and verses of Latin and Greek; and to do this no deduction could be safely made. He showed that the average attendance of boys was about 6,000 hours, and by assigning to each hour its particular work, if not interrupted by accident or illness, the pupil would be able to come up to the prescribed standard. My friend tried to see if a few minutes could not be gained for a small amount of science, but the teacher, with his experience of thirty years, was inexorable, and he could not crowd in a knowledge of this world into the course of studies even edgewise. It has been sometimes said that the most ignorant members of our community are our men of education; and after looking over the scheme of studies which the victims of liberal education are obliged to follow, the paradoxical remark would almost appear to be true. It may therefore be asked, What change the advocates of reform would propose? I cannot attempt to answer this question for all parties, as there is little uniformity of belief on the subject; but it may be well to state the case of a prominent party in the modern agitation. We have a large class among us who admit the culture to be derived from the study of language, and who would not on any account banish Latin and Greek from the curriculum; but they would remove that study to a later part of the course, and replace it by scientific subjects. They think that those subjects which cultivate and strengthen the powers of perception, observation, and judgment, should be taught first. They would instruct the youth in a knowledge of the laws of health or physiology; they would have him know something about plants, animals, minerals, and the commonest laws of chemistry and physics, so that if the pupil is compelled to leave school at an early age, he would know how to take care of mind and body, and be enabled to turn his knowledge to some account. They would commence the study of Latin and Greek at a period when the mind is more mature, and thus avoid the enormous waste of time, the bad habits of droning over lessons, and the monopolising character of the present system. There are so many instances of persons who commenced the study of the classics at mature years, who have excelled all others, that the advocates of postponing languages to the latter part of a boy's course appear to be justified in their claim. If the study of Latin and Greek could be commenced after the student enters college, it is believed that more real progress would be made in the four years of the college course than is effected under the present arrangement of devoting ten years of a boy's life to this study. This is the compromise that many good men advocate. They wish the preparatory schools to be wholly given up to mathematical, scientific, and English studies, and to have the colleges assume the charge of the classics. Instead of devoting every hour of the preparatory course to languages, they would give the time to the sciences, and they would demand a knowledge of the general principles of science as a requisite for admission to college. This would be turning the tables entirely, and would afford scientific men a chance to try the effect of the modern education. The other side have had it all their own way for a long time, and it would appear to be no more than fair for them to let people of different views have a chance. Such a radical change as this cannot be accomplished at once. It would demand immense moral courage on the part of the trustees of a college to expose themselves to the cry of lowering the standard of study. They would have the alumni of existing institutions and the prejudices of the whole community against them, and it would require a generation before the majority would become reconciled to the new order of things. Another obstacle would also arise at the outset, and that would be the difficulty of securing competent teachers of the natural sciences. It is this obstacle that has stood in the way of the introduction of the study of science in our schools. There are far too few teachers. To surmount this difficulty in the city of New York a normal college for females and a free college for males have been established, and scientific schools have been founded in all parts of the country. These institutions are destined to work a great revolution. As soon as they have trained a sufficient number of teachers, we shall find our public schools affording a better education than at present, and their example will have to be followed by the owners of private schools, who desire to keep up with the progress of the age. What we want is science taught in plain English, and there is every prospect of our speedily attaining the desired end."

## SCIENTIFIC SERIALS

Numbers 8, 9, and 10 of the 27th volume of the *Proceedings of the Swedish Academy of Sciences* (Öfversigt af Kongl. Vetenskaps Akademiens Förhandlingar) which have just reached us, contain several valuable contributions to science. The most important of these relate to zoological subjects. Thus we find from M. Anton Stuxberg the first portion of a paper modestly described as a contribution to the Myriopodology of Scandinavia, but containing a synonymic revision, with descriptions, of the Swedish Chilognatha, under which the author recognises the genera *Fulus*, *Isobates*, *Blaniulus*, *Polydesmus*, *Craspedosoma*, *Glomeris*, *Polyxenus*, and *Polysponium*, including in all eighteen species. M. G. Lindström contributes a paper on opercular structures in some recent and Silurian corals, in which he refers especially to *Goniophyllum pyramidale* and *Cystiphyllum prismaticum*. From M. Gustaf Eisen we have a most valuable contribution to the Oligochætal fauna of Scandinavia, illustrated with numerous figures on seven plates, and containing a monograph of the Scandinavian species of the genus *Lumbricus*, of which eight are recognised by the author. As the characters are given in Latin, and most of the species are found in this country, this paper will be of particular value to British naturalists. One species, *Lumbricus purpureus*, is described as new.—M. J. E. Areschoug communicates a list, with remarks, of a series of algæ collected by Dr. Hedenborg at Alexandria.—The longest paper is an account, by Prof. A. E. Nordenskiöld, of the Swedish Expedition to Greenland in 1870. This paper contains some interesting observations, illustrated with diagrams, on the glacial phenomena of Greenland; the remarks on the geology of the more interesting parts of the coast, especially those where fossil plants are found, are also of great importance; as is the account given of the supposed meteoric iron-stones of enormous size which have lately attracted so much attention. Analyses of the material of these masses by the authors, T. Nordström and J. Lindström, are given. Lists of the land plants and algæ collected on the expedition, and of the microscopic algæ obtained from the inland ice, form an appendix to the paper. M. P. T. Cleve contributes a paper on platinum-bases containing organic radicals, and M. G. R. Dahlander some investigations relating to the mechanical theory of heat.

THE *American Naturalist* for January (vol. vi., No. 1) commences with Prof. Agassiz's letter, already printed in our columns, on Deep-sea Dredgings. Mr. F. W. Putnam follows, with an extremely interesting and well-illustrated article on the Blind Fishes of the Mammoth Cave of Kentucky and their Allies, a sequel to Mr. Packard's paper on the Blind Insects of the same locality in the previous number. Dr. R. H. Ward describes a new erecting arrangement, especially designed for use with binocular microscopes. One of the most interesting articles in the number is on the Rattlesnake and Natural Selection, by Prof. N. S. Shaler, who, from observation of the animal in its native haunts, regards the rattle as a useful appendage, imitating the note of the Cicada, and thus attracting birds which are in the habit of preying on that insect. Prof. Shaler states that, without committing himself to a belief in the sufficiency of natural selection to account for the existence of the snake's rattle, he has been driven step by step from a decided opposition to the whole theory, and compelled to accept it as a *vera causa*, though still thinking it more limited in its action than Mr. Darwin believes. There is the usual supply of interesting short notes on the various branches of natural history.

*Journal of the Scottish Meteorological Society*, October 1871, New Series, No. xxvii.—This number of the *Journal of the Scottish Meteorological Society* contains a paper by Mr. Buchan, the secretary, "On the Rainfall of Scotland," based on observations made at forty-six places during long series of years. The questions of droughts and excessively wet years are dealt with. As regards their geographical distribution it is shown that some have been felt over the whole of Scotland, whilst others have been restricted to the west or to the east of the country, or within still narrower limits; and as regards their recurrence, that there has been no periodicity observed, and that there is nothing in the observations of the past forty years to sanction the opinion that there has been any progressive increase or decrease in the Scottish rainfall. The important engineering question of the deficiency of the three driest consecutive years' rainfall from the average is carefully examined, and the conclusion is arrived at, that in estimating the rainfall of the three driest consecutive years, it will not be safe to deduct less than one-fourth from the